



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|-------------------------|------------------|
| 10/716,912 | 11/18/2003 | Robert J. Atmur | 024.0020 | 6412 |
| 29906 | 7590 | 09/27/2005 | EXAMINER | |
| INGRASSIA FISHER & LORENZ, P.C. 7150 E. CAMELBACK, STE. 325 SCOTTSDALE, AZ 85251 | | | WIEHE, NATHANIEL EDWARD | |
| | | ART UNIT | PAPER NUMBER | |
| | | 3745 | | |

DATE MAILED: 09/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

,rath

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/716,912 | ATMUR ET AL. | |
| | Examiner | Art Unit | |
| | Nathan Wiehe | 3745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 18 November 2003.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-20 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) 12-14 and 19 is/are allowed.
 6) Claim(s) 1-11,15-18 and 20 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 14 April 2004 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11182003</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 18 November 2003 is noted. The submission is in compliance with the provisions of 37 CFR 1.97 and 1.98. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "104" has been used to designate both the engine command signal and impeller in Fig. 1A. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The abstract of the disclosure is objected to because undue length. Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities:

In paragraph [0021] "controller 108" should be --controller 102--, multiple instances,

In paragraph [0027] "210b" should be --208--, and

In paragraph [0036] "(Shown as blades 704)" should be --(Shown as blades 604)--, multiple instances.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10 recites the limitation "of claim 10" in line 1. There is insufficient antecedent basis for this limitation in the claim. The examiner assumes that applicant intending claim 10 to be dependent from claim 9. Under this assumption the claim, as far as it is definite, is addressed in the double patenting rejection below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 15-17 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Wham (4,648,345). Wham discloses the method of controlling the heading of a vehicle (10) by using a variable blade pitch impeller (14,16). Wham's impeller is connected to a

driveshaft (30) and includes a plurality of blades (18) that pivot in response to a magnetic field produced by electromagnets (34). Wham's electromagnets vary the impeller blade (18) pitch in response to a control signal (produced by microprocessor (48) and digital-to-analog converter (56)). Wham's microprocessor, "causes predetermined currents to be applied to the selected ones of coils 38 for the appropriate time intervals so that the electromagnets adjacent the permanent magnets 32 connected to each of the six propeller blades 18 will be moved the appropriate amounts"(Wham column 4, lines 29-34), thus the control signal inherently has a amplitude and phase corresponding to a desired heading of the vehicle. Also, Wham states, "cyclic and collective pitch of the blades on each of the propellers may be independently carried to precisely maneuver the vessel in six degrees of freedom."(Wham column 2, line 66-column 3, line 1), thus rotating the impeller forward or reverse is inherent for the disclosure of Wham. Further Wham discloses that, "The pitch of the blades can be varied cyclically and collectively in accordance with any real continuous function, and not just sinusoidal" (Wham abstract).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wham in view of an engineering expedient. Wham, as applied to claim 15 above, teaches the use of any real continuous non sinusoidal function as a control signal in a magnetically actuated impeller blade pitch control system, but it does not expressly state the use of a sawtooth waveform. It is common practice in the art of blade pitch control signals to use sawtooth functions in place of sinusoidal functions. Both functions are periodic and have an amplitude and phase and would perform equally well in the instant case. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the control signal of Wham by using a sawtooth waveform as an engineering expedient.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-11 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1,1,1,5,6,1,7,8,9,9,10, respectively of U.S. Patent No. 6,926,566 in view of Wham. Although the conflicting

claims are not identical, they are not patentably distinct from each other because. The application claims include additional features not claimed in the patent. The inclusion of a magnetic actuator to receive the control signal and to produce an electromagnetic field and in turn pivot at least one of the control blades is an obvious improvement in view of Wham.

| Application Claims | U.S. Patent No. 6,926,566 Claims |
|--|--|
| <p>1. A vehicle having an integrated propulsion and guidance system, the vehicle comprising:</p> <p>an engine configured to rotate a driveshaft;</p> <p>an impeller coupled to the driveshaft to thereby propel the vehicle, wherein the impeller comprises a hub, a plurality of fixed blades, and at least one control blade coupled to a magnet and configured to rotate with respect to the hub;</p> <p>a control system coupled to the impeller, wherein the control system is configured to provide a control signal; and</p> <p>a magnetic actuator configured to receive the control signal and to produce an electromagnetic field as a function of the control signal and to produce an electromagnetic field as a function of the control signal, wherein the magnetic field is operable to displace the magnet and to thereby pivot the at least one control blade with respect to the hub.</p> <p>2. The vehicle of claim 1 wherein the magnetic actuator comprises an electromagnet having an electrical conductor.</p> | <p>1. A vehicle having an integrated propulsion and guidance system, the vehicle comprising:</p> <p>an engine configured to rotate a driveshaft;</p> <p>an impeller coupled to the driveshaft to thereby propel the vehicle, wherein the impeller comprises a hub and a plurality of blades, wherein the plurality of blades comprises at least one pivotal blade pivotably mounted to the hub and at least one fixed blade rigidly fixed to the hub; and</p> <p>a control system coupled to the impeller, wherein the control system is configured to provide a control signal to the impeller to produce blade pitch oscillations of the at least one pivotal blade as the plurality of blades rotate about the hub, and to vary the phase and magnitude of the blade pitch oscillations as the impeller rotates about the hub to thereby simultaneously propel and guide the vehicle with the impeller.</p> |

| | |
|--|--|
| | |
| 3. The vehicle of claim 2 wherein the control signal corresponds to an electrical current provided to the electrical conductor. | |
| 4. The vehicle of claim 1 wherein the control signal comprises a sinusoidal waveform. | 5. The vehicle of claim 1 wherein the control signal comprises a sinusoidal waveform. |
| 5. The vehicle of claim 1 wherein the control signal comprises a sawtooth waveform. | 6. The vehicle of claim 1 wherein the control signal comprises a sawtooth waveform. |
| 6. The vehicle of claim 1 wherein the magnet is a permanent magnet. | |
| 7. The vehicle of claim 1 wherein the control system is further configured to adjust the phase of the control signal to thereby adjust the phase of the blades pitch adjustment applied to at least one control blade. | 7. The vehicle of claim 1 wherein the control system is further configured to adjust the phase of the control signal to thereby adjust the phase of the blade pitch adjustment applied to the at least one of the plurality of blades. |
| 8. The vehicle of claim 7 wherein the control system is further configured to adjust the magnitude of the control signal to thereby adjust the magnitude of the blade pitch adjustment applied to the at least one control blade. | 8. The vehicle of claim 7 wherein the control system is further configures to adjust the magnitude of the control signal to thereby adjust the magnitude of the blade pitch adjustment applied to the at least one of the plurality of blade. |
| 9. The vehicle of claim 1 further comprising a second impeller configured to rotate in an opposite direction from the impeller, wherein the second impeller comprises a second hub, a second plurality of fixed blades and at least one second control blade coupled to a second magnet and pivotable with respect to the second hub. | 9. The vehicle of claim 1 further comprising a second impeller configure to rotate in an opposite direction from the impeller, wherein the second impeller comprises a second hub and a second plurality of blades, and wherein at least one of the second plurality of blades is pivotable with respect to the second hub. |

10. The vehicle of claim "10",--9--, further comprising a **second magnetic actuator coupled to the second impeller wherein the magnetic field is operable to displace the second magnet and to thereby pivot the at least one second control blade with respect to the second hub.**

11. The vehicle of claim 10 wherein the control system is further configured to provide a second control signal to the second magnetic actuator.

10. The vehicle of claim 9 wherein the control system is further configured to provide a second control signal to the second impeller to **pivot the at least one of the second plurality of blades with respect to the second hub as the second plurality of blades rotates about the second hub.**

Claim 1 of U.S. Patent No. 6,926,566 discloses everything in claims 1,2,3 and 6 except for the use of a magnetic actuator and its corresponding structural elements. Wham discloses the use of a magnetic actuator; including electromagnets (34), electrical conductor (38) and permanent magnets (32), that receive a control signal (from microprocessor (48)) and produce an electromagnetic field which displaces the permanent magnets (32) thereby pivoting blades 18 with respect to hub (20). The control signal of Wham corresponds to an electrical current provided to the electrical conductor (38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the control system of claim 1 of U.S. Patent No. 6,926,566 by including a magnetic actuator and corresponding structure, as taught by Wham, in order to control blade pitch without the use of mechanical linkages.

Claims 5,6,7 and 8 of U.S. Patent No. 6,926,566 discloses everything in claims 4,5,7 and 8, respectively, except for the use of a magnetic actuator as discussed in the rejection of claim 1 above.

Claim 9, 9 and 10 of U.S. Patent No. 6,926,566 discloses everything in claim 9,10, and 11, respectively, except for the uses of a second magnetic actuator. Following the same logic as applied to claim 1 above, It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second magnetic actuator in claim 9 of U.S. Patent No. 6,926,566, identical to the one discussed above, as taught by Wham in order to control blade pitch without the use of mechanical linkages.

Allowable Subject Matter

Claims 12-14 and 19 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art teaches the use of magnetic actuators to control blade pitch, see Wham. However, the use of a pair of control blades joined by a shaft in conjunction with a magnetic actuator is not taught in the art.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The patent issued to Peterson discloses an impeller including cyclic and collective blade pitch control. The patent issued to Duncan discloses a two-impeller propulsion system. The patent issued to Vanderbeck discloses a magnetic actuator means for adjusting blade pitch or a blade flap.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Wiehe whose telephone number is (571)272-8648. The examiner can normally be reached on Mon.-Thur. and alternate Fri., 7am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571)272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Nathan Wiehe
Examiner
Art Unit 3745



EDWARD K. LOOK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700

9/22/05